

**CLAIMS:**

1. A scanning interferometer comprising:
  - i. a light source;
  - ii. a fiber optic assembly comprising:
    - a. polarization maintaining fiber having P and S modes;
    - b. splitting means for splitting the P and S modes propagating in said fiber wherein said S mode propagates in one arm and said P mode propagates in the other arm;
    - c. an optical path length modulator; and
    - d. a reference mirror.
2. An interferometer as claimed in claim 1 wherein said polarization maintaining fiber has fast and slow birefringent axes supporting fast and slow propagation modes.
3. An interferometer as claimed in claim 1 further comprising an analyzer.
4. An interferometer as claimed in claim 1 further comprising a detector.
5. An interferometer as claimed in claim 1 wherein said modulator is a piezo-electric actuator and a fiber stretching device.
6. An interferometer as claimed in claim 5 wherein said fiber stretching device has a low polarization mode dispersion.
7. An interferometer as claimed in claim 1 wherein said light source is a super luminescent diode.

8. An interferometer as claimed in claim 1 wherein said light source is an edge emitting light emitting diode.

9. An interferometer as claimed in claim 1 wherein said splitting means is a polarization splitter.

10. A scanning interferometer as claimed in claim 1 where said splitting means is a coupler having four polarization maintaining fiber ports one of which is orientated with birefringent axes orthogonal to the other three ports.

11. A scanning interferometer comprising:

- i. a light source comprising a super luminescent diode or an edge emitting light emitting diode;
- ii. a fiber optic assembly comprising:
  - a. polarization maintaining fiber having fast and slow birefringent axes supporting fast and slow propagation modes;
  - b. a polarization splitter;
  - c. an optical path length modulator comprising a piezo-electric actuator and a fiber stretching device having a low polarization mode dispersion;
  - d. a reference mirror;
  - e. an analyzer; and
  - f. a detector.